AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A ferroelectric thin-film production method comprising:

an etching process of dipping one surface in an etching solution to thereby etch the one surface, with respect to a ferroelectric crystal which has the one surface and another surface that face each other and in which an etching rate of the one surface is greater than an etching rate of the another surface in such a condition that polarization directions are oriented in one direction; and

a voltage applying process of applying a predetermined voltage between the one surface and the another surface, which is performed simultaneously with the etching process.

2. (Original) The ferroelectric thin-film production method according to claim 1, wherein the ferroelectric crystal is a single crystal wafer of a ferroelectric substance.

3. (Original) The ferroelectric thin-film production method according to claim 1, wherein the ferroelectric crystal includes at least one of $LiNb_xTa_{1-x}O_3$ ($0 \leq x \leq 1$), M: $LiNb_xTa_{1-x}O_3$ ($0 \leq x \leq 1$, M is a doping material), and $K_3Li_{2-x}(Nb_{1-y}Ta_y)_{5+x}O_{15+2x}$.

4. (Original) The ferroelectric thin-film production method according to claim 1, wherein if a desired thickness of the ferroelectric crystal is d and a coercive electric field of the ferroelectric crystal is Ec, the predetermined voltage is Ec×d.

5. (Original) The ferroelectric thin-film production method according to claim 1, wherein the voltage is a direct current voltage.

6. (Original) The ferroelectric thin-film production method according to claim 1, wherein the voltage is a pulse voltage.

7. (Original) The ferroelectric thin-film production method according to claim 4, wherein the desired thickness is less than 1μm.

8. (Original) The ferroelectric thin-film production method according to claim 1, wherein the etching solution includes hydrofluoric acid.

9. (Original) The ferroelectric thin-film production method according to claim 1, wherein the etching solution has conductivity.

10. (Original) The ferroelectric thin-film production method according to claim 1, wherein said etching process includes a heating process of heating the etching solution.

11. (Original) The ferroelectric thin-film production method according to claim 1, wherein said etching process includes a stirring process of stirring the etching solution.

12. (Original) The ferroelectric thin-film production method according to claim 1, wherein said etching process includes a filtrating process of filtrating the etching solution.

13. (Original) The ferroelectric thin-film production method according to claim 1, wherein the ferroelectric thin-film production method comprises:

an electrode forming process of forming an electrode in a film shape on the another surface;

a substrate connecting process of connecting the electrode and a substrate; and

a polishing process of polishing the one surface of the ferroelectric crystal, and

said etching process and said voltage applying process are performed after said electrode forming process, said substrate connecting process and said polishing process.

14. (Original) The ferroelectric thin-film production method according to claim 13, wherein the substrate has a difference in a coefficient of thermal expansion of 50% or less, as compared to the ferroelectric crystal.

15. (Original) The ferroelectric thin-film production method according to claim 13, wherein the substrate includes a same material as that of the ferroelectric crystal.

16. (Original) The ferroelectric thin-film production method according to claim 13, wherein the electrode and the substrate are connected by providing an adhesive layer therebetween, in said substrate connecting process.

17. (Original) The ferroelectric thin-film production method according to claim 16, wherein a conductive base layer which is highly adhesive is provided at least one of between the

adhesive layer and the electrode, and between the adhesive layer and the substrate, in said substrate connecting process.

18. (Original) The ferroelectric thin-film production method according to claim 13, wherein the substrate is a glass substrate, and the electrode and the substrate are directly connected by anodic bonding, in said substrate connecting process.

19. (Original) The ferroelectric thin-film production method according to claim 13, wherein a glass film is provided between the electrode and the substrate, and the electrode and the substrate are connected by anodic bonding, in said substrate connecting process.

20. (Original) The ferroelectric thin-film production method according to claim 13, wherein a smoothing process is performed to the one surface after the one surface is polished.

21. (Withdrawn) A voltage-application etching apparatus used in an etching process and a voltage applying process in a ferroelectric thin-film production method comprising: an etching process of dipping one surface in an etching solution to thereby etch the one surface, with respect to a ferroelectric crystal which has the one surface and another surface that face each other and in which an etching rate of the one surface is greater than an etching rate of the another surface in such a condition that polarization directions are oriented in one direction; and a voltage applying process of applying a predetermined voltage between the one surface and the another surface,

said voltage-application etching apparatus comprising:

a container to dip the one surface in the etching solution;

a sealing device for sealing a portion other than the one surface from the etching solution;

a power supply for applying the predetermined voltage between the one surface and the another surface;

a first connecting device for electrically connecting one output terminal of said power supply with the one surface; and

a second connecting device for electrically connecting another output terminal of said power supply with the another surface.

22. (Withdrawn) The voltage-application etching apparatus according to claim 21, wherein said sealing device is an acid-resistant O ring which is pressed onto a periphery portion on the one surface or an outer edge of the one surface.

23. (Withdrawn) The voltage-application etching apparatus according to claim 21, further comprising a heating device for heating the etching solution.

24. (Withdrawn) The voltage-application etching apparatus according to claim 21, further comprising a stirring device for stirring the etching solution.

25. (Withdrawn) The voltage-application etching apparatus according to claim 21, further comprising a filtrating device for filtrating the etching solution.

26. (Withdrawn) A ferroelectric crystal thin-film substrate comprising:

a substrate;

an electrode formed on the substrate; and

a ferroelectric crystal which is formed on the electrode and which is less than 1μm in thickness, wherein

an area size of an entire surface of the substrate is equal to or greater than 10mm^2.

27. (Withdrawn) The ferroelectric crystal thin-film substrate according to claim 26, wherein the substrate is a glass substrate, and the substrate and the electrode are directly connected by anodic bonding.

28. (Withdrawn) The ferroelectric crystal thin-film substrate according to claim 26, wherein in the ferroelectric crystal, polarization directions are perpendicular to the surface and oriented in a same direction.

29. (Withdrawn) A ferroelectric crystal wafer comprising:

a substrate;

an electrode formed on the substrate; and

a ferroelectric crystal which is formed on the electrode and which is less than 1μm in thickness.

30. (Withdrawn) The ferroelectric crystal wafer according to claim 29, wherein the substrate is a glass substrate, and the substrate and the electrode are directly connected by anodic bonding.

31. (Withdrawn) The ferroelectric crystal wafer according to claim 29, wherein in the ferroelectric crystal, polarization directions are perpendicular to the surface and oriented in a same direction.